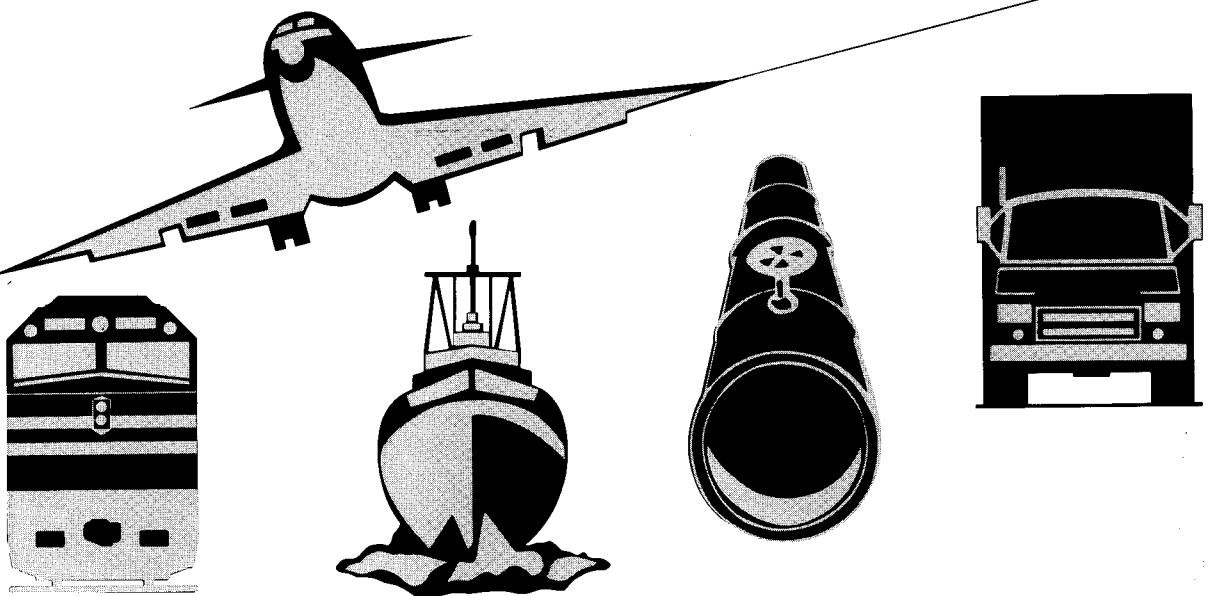


# **NATIONAL TRANSPORTATION SAFETY BOARD**

**SAFETY RECOMMENDATIONS**  
**ADOPTED DURING THE MONTH OF AUGUST, 1999**





TECHNICAL REPORT DOCUMENTATION PAGE

|   |                                   |   |  |  |  |                |                             |         |         |         |         |         |  |                 |                   |                    |                                   |         |  |                |  |                    |  |                    |  |         |  |         |  |
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# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** H-99-27

Honorable Kenneth R. Wykle  
Administrator  
Federal Highway Administration  
Washington, D.C. 20590

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>2</sup> and one by NICTD, separated by 86 feet and 9 3/4 inches of paved asphalt (from the southernmost Conrail rail to the northernmost NICTD rail). A 58-foot space lay between the southernmost Conrail gate and the northernmost NICTD gate. Thus, the maximum storage area for the grade crossing was about 58 feet.

The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-

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<sup>1</sup> For additional information, read *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Federal Highway Administration:

Work together with the Federal Railroad Administration, the Indiana Department of Transportation, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing.  
(H-99-27)

Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Railroad Administration, the Indiana Department of Transportation, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District.

Please refer to Safety Recommendation H-99-27 in your reply. If you need additional information, you may call (202) 314-6437.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:   
Jim Hall  
Chairman

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** H-99-28

Mr. Curtis Wiley  
Commissioner  
Indiana Department of Transportation  
Indiana Government Center North  
100 North Senate Avenue, Room N755  
Indianapolis, Indiana 46204-2249

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>2</sup> and one by NICTD, separated by 86 feet and 9 3/4 inches of paved asphalt (from the southernmost Conrail rail to the northernmost NICTD rail). A 58-foot space lay between the southernmost Conrail gate and the northernmost NICTD gate. Thus, the maximum storage area for the grade crossing was about 58 feet.

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<sup>1</sup> For additional information, read *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Indiana Department of Transportation:

Work together with the Federal Railroad Administration, the Federal Highway Administration, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing. (H-99-28)

Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Railroad Administration, the Federal Highway Administration, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility “to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations” (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-99-28 in your reply. If you need additional information, you may call (202) 314-6437.

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.



Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:   
Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** H-99-29

Mr. John Guydan  
General Manager  
National Steel Corporation  
Midwest Steel Division  
U.S. Route 12  
Portage, Indiana 46368-1287

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>2</sup> and one by NICTD, separated by 86 feet and 9 3/4 inches of paved asphalt (from the southernmost Conrail rail to the northernmost NICTD rail). A 58-foot space lay between the southernmost Conrail gate and the northernmost NICTD gate. Thus, the maximum storage area for the grade crossing was about 58 feet.

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The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

Therefore, the National Transportation Safety Board makes the following safety recommendation to the National Steel Corporation, Midwest Steel Division:

Work together with the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing.  
(H-99-29)

Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation H-99-29 in your reply. If you need additional information, you may call (202) 314-6437.

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:  Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-31 through -33

Honorable Jolene Molitoris  
Administrator  
Federal Railroad Administration  
Washington, D.C. 20590

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

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<sup>2</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

The Portage accident raised questions concerning railcar crashworthiness as well as grade-crossing safety. In its postaccident inspection of the railcar (NICTD car 11) through which the steel coil entered train 102, the Safety Board found problems concerning the welds of a collision post in the front bulkhead of the car. This collision post failed when the coil entered the car. According to 49 *Code of Federal Regulations* (CFR) 229.141 (a) (4), a collision post “shall have an ultimate shear value of not less than 300,000 pounds at a point even with the top of the underframe member to which it is attached.” The kinetic energy released by the impact of the coil upon its collision with the front bulkhead of car 11 was approximately 2.36 million foot pounds.

The collision post in car 11 was not designed to absorb the force of an object (such as the coil) weighing 38,030 pounds at the speed at which the collision occurred. Therefore, the Safety Board concluded that the structural elements of the NICTD railcar 11 collision post that failed were overwhelmed by the force of the collision, and the post could not have prevented penetration of the steel coil, given the train speed and the weight of the coil.

Nevertheless, the Safety Board is concerned about the lack of weld penetration and fusion and the unexplained fastener found in the collision post welds of this railcar. Although intrusion of the coil into the railcar was probably unavoidable in this accident, collision posts should always be installed to ensure optimum strength and effectiveness. The purpose of the collision posts provided within passenger cars is to prevent intrusion into the car body. Passengers and crew depend on the collision posts to provide protection in the event of an accident. The Safety Board therefore finds the existence of defective welds in the area of the collision posts disturbing. Although the weld quality did not affect the outcome of the Portage accident, the presence of defective welds can only serve to weaken the structure of the car. If adjacent welds had demonstrated the same deficiencies as those found by investigators, the strength of the collision post structure could have been significantly compromised.

The lack of joint penetration and lack of fusion found on the vertical inboard front weld would have resulted in a weld that was weaker than the 100-percent penetration (and fused) weld

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.



that was required. Because of the loading speed and the point of application in this accident, the load path did not go through either the front or rear vertical inboard welds. However, many other possible accident scenarios exist in which the strength of the vertical inboard collision post welds would have been relied upon to prevent intrusion into the car. The Safety Board concluded that, under some circumstances, the full strength of the vertical inboard collision post welds may be necessary to protect passengers and crew.

Railroad passenger and transit cars are purchased through contracts that cite detailed technical specifications. The technical specifications typically dictate requirements intended to ensure the quality and performance of the vehicle, including workmanship standards. The NICTD specification is clear that “The contractor shall be responsible for the quality of the welding and brazing done by himself and his subcontractors.”<sup>4</sup> Nippon Sharyo indicated that it performed inspections in addition to those performed by NICTD and its representatives, but the welding defects noted in the vertical inboard collision post welds were apparently not found during these inspections. No records of the Nippon Sharyo weld inspections could be reviewed by the Safety Board, but based on the presence of these weld defects, the Safety Board concluded that Nippon Sharyo did not employ sufficient quality assurance procedures during the welding of the collision post structures.

The Safety Board considers that, because of Nippon Sharyo’s insufficient welding quality assurance procedures, deficiencies such as the lack of joint penetration, the lack of fusion, and the unexplained components found in the collision post welds of this car might also be found in other Nippon Sharyo railcars in the NICTD fleet. The Safety Board is also aware of another fleet of cars, virtually identical in design to the NICTD cars, that was also manufactured by Nippon Sharyo.<sup>5</sup> It is not known whether these cars contain weld defects in the collision posts, such as the lack of penetration and fusion noted here, or whether the same weld quality assurance procedures were used in both cases.

The Safety Board is aware of no Federal requirements for welding quality assurance in the attachment of collision posts. The FRA does require, however, that collision posts be constructed to a certain strength specification and that “the attachment of these members at bottom shall be sufficient to develop their full shear value.”<sup>6</sup> Because of the vital safety role played by the collision posts, the Safety Board considers that the attachment welds should be carefully inspected to ensure that they are of a sufficient quality to fulfill the design requirements of the car.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the Federal Railroad Administration:

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<sup>4</sup> *Specification of Electric Multiple Unit Commuter Cars for Northern Indiana Commuter Transportation District*, Specification number SP90034, section S12.10(b), dated 1983.

<sup>5</sup> National Transportation Safety Board, *Collision and Derailment of Maryland Rail Commuter MARC Train 286 and National Railroad Passenger Corporation AMTRAK Train 29 near Silver Spring, Maryland, on February 16, 1996*, Railroad Accident Report NTSB/RAR-97/02 (Washington, D.C.: National Transportation Safety Board, 1997).

<sup>6</sup> 49 CFR 229.141.

Work together with the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing. (R-99-31)

Determine the extent of the weld quality assurance inadequacies demonstrated by Nippon Sharyo Ltd. in its collision post welds, and implement corrective action as necessary to ensure the strength of the collision posts. (R-99-32)

Require 100-percent nonvisual inspection of all collision post attachment welds made on multiple-unit locomotives and passenger cars during manufacture, and require that inspection records be retained for the life of the car. (R-99-33)

Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District.

Please refer to Safety Recommendations R-99-31 through -33 in your reply. If you need additional information, you may call (202) 314-6437.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:

  
Jim Hall  
Chairman



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-34

Mr. David R. Goode  
Chairman  
Norfolk Southern Corporation  
Three Commercial Plaza  
Norfolk, Virginia 23510-2191

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>2</sup> and one by NICTD, separated by 86 feet and 9 3/4 inches of paved asphalt (from the southernmost Conrail rail to the northernmost NICTD rail). A 58-foot space lay between the southernmost Conrail gate and the northernmost NICTD gate. Thus, the maximum storage area for the grade crossing was about 58 feet.

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<sup>1</sup> For additional information, read *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Norfolk Southern Corporation:

Work together with the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, and the Northern Indiana Commuter Transportation District to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing.  
(R-99-34)

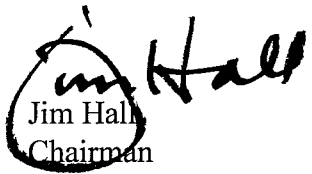
Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, and the Northern Indiana Commuter Transportation District.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility “to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations” (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-99-34 in your reply. If you need additional information, you may call (202) 314-6437.

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:   
Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-35 and -36

Mr. Gerald R. Hanas  
General Manager  
Northern Indiana Commuter Transportation District  
33 East U.S. Highway 12  
Chesterton, Indiana 46304

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>2</sup> and one by NICTD, separated by 86 feet and 9 3/4 inches of paved asphalt (from the southernmost Conrail rail to the northernmost NICTD rail). A 58-foot space lay between the southernmost Conrail gate and the northernmost NICTD gate. Thus, the maximum storage area for the grade crossing was about 58 feet.

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<sup>1</sup> For additional information, read *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

The long combination vehicle involved in the accident was 82 feet long, 24 feet longer than the 58-foot storage distance. Nevertheless, nothing in law or practice prevented the 82-foot-long vehicle from using this crossing. Therefore, the Safety Board concluded that, as currently configured, the Midwest Steel grade-crossing storage area cannot safely accommodate all vehicles that are allowed to use it.

Since the Portage accident in late June 1998, several additional incidents and near-misses have taken place at the Midwest Steel grade crossing. The Safety Board understands that, even before this accident occurred, the National Steel Corporation, NICTD, the Indiana Department of Transportation, the Port of Indiana, and the Federal Railroad Administration had agreed that the safety issues raised by the crossing should be addressed. The Safety Board has long advocated total grade separation as the best means of ensuring grade-crossing safety.<sup>3</sup>

The Portage accident raised questions concerning railcar crashworthiness as well as grade-crossing safety. In its postaccident inspection of the railcar (NICTD car 11) through which the steel coil entered train 102, the Safety Board found problems concerning the welds of a collision post in the front bulkhead of the car. This collision post failed when the coil entered the car. According to 49 *Code of Federal Regulations* (CFR) 229.141 (a) (4), a collision post “shall have an ultimate shear value of not less than 300,000 pounds at a point even with the top of the underframe member to which it is attached.” The kinetic energy released by the impact of the coil upon its collision with the front bulkhead of car 11 was approximately 2.36 million foot pounds.

The collision post in car 11 was not designed to absorb the force of an object (such as the coil) weighing 38,030 pounds at the speed at which the collision occurred. Therefore, the Safety Board concluded that the structural elements of the NICTD railcar 11 collision post that failed were overwhelmed by the force of the collision, and the post could not have prevented penetration of the steel coil, given the train speed and the weight of the coil.

Nevertheless, the Safety Board is concerned about the lack of weld penetration and fusion and the unexplained fastener found in the collision post welds of this railcar. Although intrusion of the coil into the railcar was probably unavoidable in this accident, collision posts should always be installed to ensure optimum strength and effectiveness. The purpose of the collision posts provided within passenger cars is to prevent intrusion into the car body. Passengers and crew depend on the collision posts to provide protection in the event of an accident. The Safety Board therefore finds the existence of defective welds in the area of the collision posts disturbing. Although the weld quality did not affect the outcome of the Portage accident, the presence of defective welds can only serve to weaken the structure of the car. If adjacent welds had demonstrated the same deficiencies as those found by investigators, the strength of the collision post structure could have been significantly compromised.

The lack of joint penetration and lack of fusion found on the vertical inboard front weld would have resulted in a weld that was weaker than the 100-percent penetration (and fused) weld

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998), p. 64.



that was required. Because of the loading speed and the point of application in this accident, the load path did not go through either the front or rear vertical inboard welds. However, many other possible accident scenarios exist in which the strength of the vertical inboard collision post welds would have been relied upon to prevent intrusion into the car. The Safety Board concluded that, under some circumstances, the full strength of the vertical inboard collision post welds may be necessary to protect passengers and crew.

Railroad passenger and transit cars are purchased through contracts that cite detailed technical specifications. The technical specifications typically dictate requirements intended to ensure the quality and performance of the vehicle, including workmanship standards. The NICTD specification is clear that "The contractor shall be responsible for the quality of the welding and brazing done by himself and his subcontractors."<sup>4</sup> Nippon Sharyo indicated that it performed inspections in addition to those performed by NICTD and its representatives, but the welding defects noted in the vertical inboard collision post welds were apparently not found during these inspections. No records of the Nippon Sharyo weld inspections could be reviewed by the Safety Board, but based on the presence of these weld defects, the Safety Board concluded that Nippon Sharyo did not employ sufficient quality assurance procedures during the welding of the collision post structures.

The Safety Board considers that, because of Nippon Sharyo's insufficient welding quality assurance procedures, deficiencies such as the lack of joint penetration, the lack of fusion, and the unexplained components found in the collision post welds of this car might also be found in other Nippon Sharyo railcars in the NICTD fleet.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the Northern Indiana Commuter Transportation District:

Work together with the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, and the Norfolk Southern Corporation to make, within 2 years, permanent engineering changes to the Midwest Steel highway-rail grade crossing that will minimize or eliminate safety hazards at this crossing. (R-99-35)

Inspect the collision post welds of all Nippon Sharyo Ltd. railcars in your fleet and repair any welds that are deficient. (R-99-36)

Also, the Safety Board issued safety recommendations to the U.S. Department of Transportation, the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, and the Norfolk Southern Corporation.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident

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<sup>4</sup> *Specification of Electric Multiple Unit Commuter Cars for Northern Indiana Commuter Transportation District*, Specification number SP90034, section S12.10(b), dated 1983.

investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-99-35 and -36 in your reply. If you need additional information, you may call (202) 314-6437.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:



Jim Hall  
Chairman



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-37 through -45

Mr. Gerald R. Hanas  
General Manager  
Northern Indiana Commuter Transportation District  
33 East U.S. Highway 12  
Chesterton, Indiana 46304

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

In a June 18, 1998, letter to National Transportation Safety Board Chairman Jim Hall, U.S. Senator Richard Lugar and U.S. Congressman Peter J. Visclosky cited three previous accidents that had involved the NICTD system and expressed concern about NICTD's long-term safe operation. The Safety Board reviewed the accident history of the NICTD system and determined that, given the series of incidents experienced on the NICTD line, an evaluation of NICTD's overall safety should be conducted.<sup>2</sup>

The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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<sup>1</sup> National Transportation Safety Board, *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> For additional information, read *Northern Indiana Commuter Transportation District Railroad Safety Assessment*, Railroad Special Investigation Report NTSB/SIR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

The special investigation examined numerous factors, including NICTD's history and operations. For instance, the investigation found that, in 1990, the Federal Railroad Administration (FRA) had performed a systems assessment of various Chicago commuter rail operations, including NICTD. Following this assessment, the FRA recommended that NICTD eliminate AC line circuits and convert to DC line circuits to reduce the potential for grounding.

In an interview with Safety Board staff, the NICTD chief electrical engineer stated that NICTD's installation of electronic track circuits and conversion of signal control line circuits is about 75 percent complete. The Safety Board acknowledges that NICTD has made progress in converting its signal system since the FRA's recommendation in 1990. However, in light of the safety problems (such as false proceed signal indications) that can result from electrical grounding and the nearly 9 years since the FRA made the recommendation, the Safety Board is concerned about the pace at which the project is being completed. The Safety Board concluded that NICTD's failure to complete the elimination of AC line circuits and conversion to DC line circuits on its signal system may have reduced the system's safety. Because the conversion of signal control circuits would reduce the potential for grounding, it would result in increased NICTD system safety and should be completed as soon as possible.

One of the major issues reviewed during the special investigation concerned safety at NICTD grade crossings. NICTD told the Safety Board that the NICTD system currently contains 151 crossings, of which 103 are public, 37 are private, and 11 are pedestrian railroad crossings at grade. Forty-two crossings have passive railroad warning devices (crossbuck signs), and 11 crossings have no warning devices. Thus, 53 crossings, about one-third of all NICTD grade crossings, currently have passive or no warning devices. Fifteen of the 42 locations with railroad crossbucks are on private crossings, and all 11 crossings with no warning devices are on private crossings.

On July 21, 1998, the Safety Board adopted a safety study of passive grade crossings that detailed the dangers inherent in many passive grade-crossing arrangements.<sup>3</sup> The study noted that

In 1996, passive grade crossings accounted for about three-quarters of all grade crossings in the United States; although there is less highway and train traffic at passive crossings than at active crossings, passive crossings accounted for 54 percent of all grade-crossing accidents and 60 percent of all grade-crossing fatalities in that year.<sup>4</sup>

The report further found that

A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998).

<sup>4</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 61.

includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and advance warning devices at some NICTD passive grade crossings poses a risk to NICTD's customers and motorists.

In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

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<sup>5</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 64.

<sup>6</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, pp. 68-74.

NICTD participates in Operation Lifesaver<sup>7</sup> and makes presentations designed to educate interested parties about the dangers of grade crossings. The NICTD chief of police is on the Indiana Operation Lifesaver Committee and participates in Operation Lifesaver programs. Since the Portage grade-crossing accident in June 1998, NICTD has given two Operation Lifesaver education programs at the Midwest Steel grade crossing, during which NICTD representatives provided truckers with Operation Lifesaver materials about the dangers of highway-rail grade crossings. NICTD has also employed a grade-crossing "near-miss" identification program since the mid-1980s.

The Safety Board acknowledges NICTD's efforts to decrease the number of violations that motorists commit at highway-rail grade crossings. Nonetheless, NICTD records show that, between 1995 and 1998, a total of 215 highway-rail grade-crossing violations were reported on the NICTD system and 109 traffic citations were issued. NICTD sent 54 highway-rail grade accident or incident reports to the FRA between January 1, 1993, and July 31, 1998. Five fatalities and five injuries were reported to have resulted from these accidents or incidents. Also, on October 21, 1998, while riding in a NICTD cab car en route to Chicago, Illinois, two Safety Board investigators observed four vehicles violating railroad grade-crossing signals. Therefore, the Safety Board concluded that, despite the NICTD near-miss program to educate motorists who violate highway-rail grade crossings, significant numbers of highway-rail grade-crossing violations continue on the NICTD system.

The Safety Board considers that the NICTD near-miss program could be improved. In particular, the current program does not provide NICTD employees feedback about the outcomes of their reports. NICTD employees reporting near-miss incidents and providing identification information about the motorist causing the incident are not told what use is made of the information they provide. They do not know, for example, whether the motorist is issued a traffic citation or other penalty based on their report. In other words, no one tells them the specific results of their participation in the near-miss reporting program. Some NICTD employees told Safety Board representatives that if the NICTD employee reporting the violation were made aware of the result of his or her near-miss report, the employee would be encouraged to continue to report incidents.

In summary with regard to grade-crossing safety on the NICTD system, the Safety Board found through its investigation that several factors point to possible problems in this area. First, NICTD has a relatively high density of grade crossings on its system (approaching two crossings per mile of track), which provides substantial opportunity for grade-crossing accidents to occur. Also, about one-third of NICTD grade crossings have passive or no warning devices, and 11 passive grade crossings on the NICTD system have no signage or advance warning devices.

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<sup>7</sup> Operation Lifesaver is a nonprofit, nationwide public education program designed to eliminate collisions, deaths, and injuries at highway-rail intersections and on railroad rights of way. It is sponsored cooperatively by a variety of partners, including Federal, State, and local government agencies, highway safety and transportation organizations, and the Nation's railroads. The program is designed to increase public awareness about the danger where roadways cross train tracks and on railroad rights of way. Operation Lifesaver also seeks to improve driver and pedestrian behavior at highway-rail intersections by encouraging compliance with traffic laws relating to crossing signs and signals. Operation Lifesaver also emphasizes the enforcement of existing traffic and trespassing laws, the consolidation and closure of redundant highway-rail crossings, and the improvement of crossing engineering.

Further, NICTD has experienced a number of grade-crossing accidents and incidents in recent years, and, despite steps taken by NICTD to improve grade-crossing safety, near-miss and other incidents continue to occur at NICTD grade crossings. In addition, NICTD personnel repeatedly expressed concerns about the risks posed by grade crossings. The Safety Board considered that all these factors indicate that a systematic effort on the part of those agencies best equipped to develop methods to improve NICTD grade-crossing safety is needed.

The Safety Board also examined NICTD's safety programs, including its System Safety Program Plan (SSPP), during the course of this special investigation. Following the Safety Board's investigation of the 1996 collision of a Maryland Rail Commuter train with an Amtrak train in Silver Spring, Maryland,<sup>8</sup> the FRA issued Emergency Order 20, requiring certain inspections and modifications to commuter train operations and passenger equipment. Among other provisions, Emergency Order 20 required each property to submit an emergency preparedness plan and an effective safety program to the FRA. In the section "Interim system safety plans," the order stated that

The plan shall take into consideration the overall safety of all passengers and crewmembers and shall, at a minimum, address the following opportunities for risk reduction: (A) Use of cab car/multiple unit car... (B) Operating rules... (C) Adverse conditions... (D) Short-term technology enhancements... (E) Crew management... (F) Highway-rail grade crossings... (G) Emergency exit notification...<sup>9</sup>

Subsequently, the commuter railroads agreed among themselves to fulfill this element of Emergency Order 20 by developing and implementing SSPPs with the assistance of the FRA and the American Public Transit Association (APTA). The FRA planned to review the interim SSPPs to "determine whether other mandatory action appears necessary to address hazards associated with the subject rail passenger service." With respect to reviewing and approving SSPPs, the FRA is working in partnership with APTA, because APTA has personnel trained and knowledgeable in assessing SSPPs.

APTA, working with the FRA, drafted a *Manual for the Development of System Safety Program Plans for Commuter Railroads*<sup>10</sup> to provide more detailed direction to commuter railroads developing SSPPs in accordance with Emergency Order 20. The manual lists 29 elements that should be addressed in every SSPP and states that

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<sup>8</sup> National Transportation Safety Board, *Collision and Derailment of Maryland Rail Commuter MARC Train 286 and National Railroad Passenger Corporation AMTRAK Train 29 Near Silver Spring, Maryland, on February 16, 1996*, Railroad Accident Report NTSB/RAR-97/02 (Washington, D.C.: National Transportation Safety Board, 1997).

<sup>9</sup> FRA, *Commuter and Intercity Passenger Railroads, Including Public Authorities Providing Passenger Service, and Affected Freight Railroads—Emergency Order Requiring Enhanced Operating Rules and Plans for Ensuring the Safety of Passengers Occupying the Leading Car of a Train*, Emergency Order No. 20, Notice No. 1, February 20, 1996 (Washington, D.C.: U.S. Department of Transportation, 1996).

<sup>10</sup> APTA, *Manual for the Development of System Safety Program Plans for Commuter Railroads* (Washington, D.C.: American Public Transit Association, 1998).

A commuter railroad has the responsibility of maintaining oversight of its safety status and program to ensure all responsibilities are being carried out and coordinated. This process is known as system safety. A commuter railroad establishes an [SSPP] by formalizing this process in a written document.

The overall goal of a System Safety Program for commuter railroads is to identify, eliminate, minimize, and/or control safety hazards and their attendant risks by establishing requirements, lines of authority, levels of responsibility and accountability, and methods of documentation for the organization.<sup>11</sup>

On October 15, 1997, NICTD management submitted an SSPP to APTA. This draft SSPP largely reflected and formalized those safety practices that NICTD was already following. APTA did not approve the plan NICTD initially submitted; APTA returned it to NICTD with a critique that stated that the draft SSPP was not sufficiently thorough. Using the APTA comments and guidance, NICTD redrafted the SSPP and submitted a revised document that was broader in scope to APTA on April 8, 1998. NICTD included each of the 29 elements provided in the *Manual for the Development of System Safety Program Plans for Commuter Railroads* in its redrafted SSPP. APTA approved the second submission.

The NICTD superintendent of transportation began the drafting of the NICTD SSPP, and the manager of human resources completed the document and began its implementation. He told investigators that NICTD managers had met concerning the SSPP during the implementation process. NICTD accepted comments on the document format, and meeting participants discussed plans for SSPP implementation. No defined implementation plan was adopted. The original date for the SSPP implementation was May 1998. NICTD later postponed the implementation date to September 1998 and then delayed it further.<sup>12</sup> Ultimately, NICTD set no date for full implementation of the SSPP. The NICTD manager of human resources told investigators that “basically the plan is implemented [in effect] but not specifically, and now we have to live with it.” He said NICTD should amend the plan and place it in a three-ring binder to make it more “user friendly,” as well as develop a system for monitoring compliance with the SSPP. According to the NICTD general manager, NICTD is implementing the SSPP but has not completed the process.

The investigative team also interviewed the NICTD chief operating officer, chief engineer (mechanical department), track engineer, director of safety and training, and superintendent of transportation about SSPP compliance within NICTD. Those interviewed said that they knew the SSPP is a relatively new document mandated by the FRA. NICTD has issued the document to all its managers, and NICTD personnel can obtain it through their individual department managers.

Although the SSPP requires such action, NICTD has not developed an accident or investigation team (or manual) for determining the probable causes of accidents or incidents or

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<sup>11</sup> *Manual for the Development of System Safety Program Plans for Commuter Railroads*, pp. 3 and 6.

<sup>12</sup> NICTD told investigators that the complications caused by the June 18, 1998, Portage accident were one source of the implementation delay.



for administering corrective action following accidents or incidents. The NICTD human resources department conducts all nonderailment accident and incident investigations, and the transportation department investigates all derailments. Currently, corrective action is negotiated on-scene. A fully implemented SSPP would include a means of determining the probable causes of accidents and incidents and of providing corrective action.

Despite the fact that several NICTD managers have stated that the SSPP has been implemented, the consensus of those NICTD personnel providing comments to the Safety Board was that the SSPP has not yet become a well-known and accepted element of the NICTD safety structure. The Safety Board concluded that, until its SSPP required by the FRA in Emergency Order No. 20 is fully implemented, some program-related safety benefits may not be realized by NICTD. Full implementation should include the familiarization of NICTD personnel at all organization levels with the goals, components, and expected results of the SSPP.

The NICTD SSPP's implementation is under the jurisdiction of the NICTD director of safety and training (DST). The railroad established the DST position in March 1997 to formalize NICTD's safety and training practices. NICTD had no safety officer before March 1997. As defined in the SSPP, the DST has specific authority to conduct scheduled and unscheduled inspections aimed at identifying hazards and unsafe practices, operations, and conditions. The DST may halt unsafe activities or operations that present an immediate and serious hazard within the system. The DST reports safety conditions that require remedial action to the appropriate department head, the chief operating officer, the manager of human resources, and the general manager. The DST also coordinates safety training with department heads and ensures that safety rules are observed and enforced.

The DST told Safety Board investigators that he had been an assistant superintendent before assuming the role of DST and that he had received no specialized training on how to structure and implement a safety program either before or after assuming this post. The DST further stated that he had never met with NICTD's board of trustees, nor had he ever briefed them about the duties and responsibilities of the DST position.

The Safety Board has long advocated that transportation personnel be adequately trained to fulfill their job responsibilities. In particular, the person responsible for building, shaping, and managing the organization's safety system must be fully qualified to perform this duty. The DST had no experience in safety assurance before being selected for this position. He was unfamiliar with SSPPs and their functions. He was largely unaware of the vital role a DST plays in an organization. The Safety Board concluded that NICTD did not adequately prepare and train its DST to fulfill the responsibilities of the position. Because the SSPP forms the basis of the NICTD safety program, the most efficient means of preparing the DST to fulfill the responsibilities of his position would be to train him in the functions and implementation of SSPPs.

Within the current NICTD organizational structure, the DST reports to the human resources manager and not the general manager. The general manager said that this is a "good technique," since the human resources department is responsible for safety and the coordination of personnel activities. The DST said that the fact that his position is not at the department-head

level has not proven to be an obstacle, and he further stated that if he had a problem, he would not hesitate to contact the general manager.

For years, the Safety Board has stated that the lead safety officer of any transportation organization should be situated at the highest managerial level within the organization. In the case of NICTD, reorganizing the management structure so that the DST reports directly to the general manager would allow the DST to provide prompt input concerning management policies and practices that might not sufficiently address safety issues. In addition, important safety information could be communicated more reliably, avoiding the potential for miscommunication should the DST's information be misinterpreted by the department head in reporting to the general manager or, conversely, should the general manager's messages to the DST be misconstrued by the department head. Finally, placing the DST at the department-head level would send an unambiguous message to employees, customers, and the public that NICTD considers safety a high priority that encompasses and permeates all aspects of the organization. Therefore, the Safety Board concluded that the efficiency of safety information communication would be enhanced and the profile of safety would be heightened within the NICTD organization if the DST reported directly to the general manager.

Another element of NICTD's safety structure that the Safety Board examined during the special investigation was emergency response. The NICTD emergency response plan details potential emergency scenarios, as well as standard procedures necessary to manage each situation. The document also stresses the importance of communication during an emergency and provides NICTD procedural guidelines and a directory listing various phone numbers and addresses of police, fire, and rescue agencies. The plan lists approved procedures for NICTD dispatchers and train crews to follow in the event of an emergency and outlines actions for responding to an emergency, as well as procedures for establishing an emergency response team.

When interviewed by Safety Board investigators, NICTD managers expressed concern about conducting emergency responses in areas with limited accessibility, such as regions with large waterways or swampy conditions. The NICTD system includes a number of bridges over waterways and significant areas of marshy land. The Safety Board has found in previous investigations<sup>13</sup> that when accidents take place in less accessible areas, emergency rescue procedures become both more difficult and more crucial. Therefore, the Safety Board concluded that safety would be enhanced if greater efforts were made to prepare local response agencies to deal with commuter train accidents in areas that are geographically difficult to access.

NICTD's corporate safety culture was another focus of the special investigation. Corporate safety culture is an organization's set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimizing the exposure of employees, customers, and members of the public to conditions considered dangerous or injurious.<sup>14</sup> To evaluate

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<sup>13</sup> National Transportation Safety Board, *Derailment of Amtrak Train No. 2 on the CSXT Big Bayou Canot Bridge Near Mobile, Alabama, September 22, 1993*, Railroad-Marine Accident Report NTSB/RAR-94/01 (Washington, D.C.: National Transportation Safety Board, 1994).

<sup>14</sup> B.A. Turner, N.F. Pidgeon, D.I. Blockley, and B. Toft, *Position Paper for the Second World Bank Workshop on Safety Control and Risk Management, November 6-9, 1989*, "Safety Culture: Its Importance in Future Risk Management" (World Bank: Karlstad, 1989).

NICTD's corporate culture, Safety Board investigators reviewed NICTD safety programs, interviewed NICTD staff and managers, and studied NICTD's internal safety documents. While some NICTD employees stated that the organization could improve safety, the Safety Board's investigation did not reveal any instances of blatant disregard for safety concerns. The fact that the various departments within NICTD convene safety meetings during which unsafe conditions and practices are identified and addressed shows that NICTD has developed a systematic means of publicizing and resolving workplace safety issues. Furthermore, consistent with the views of many safety professionals, who contend that management is responsible for the practices, customs, and attitudes that relate to safe operations, NICTD managers have shown by their testimony and actions that they are aware they must set the tone for safety by policy and example. In addition, NICTD has provided its employees exhaustive written guidelines that stress the importance of safety to the organization. Therefore, the Safety Board concluded that NICTD's corporate culture generally encourages safety awareness in rail operations.

In summary, the special investigation of NICTD indicated that, with respect to the particular issues the Safety Board reviewed, NICTD's operating practices generally adhere to accepted safety principles, NICTD has an established system of internal safety programs, and NICTD's corporate culture generally encourages safe employee behavior. Nevertheless, the investigation indicated that NICTD has problems, which NICTD recognizes and is attempting to address, regarding the serious issue of grade-crossing safety. To enhance NICTD's safety practices, the Safety Board urges NICTD to adopt the recommendations regarding grade-crossing safety, signal upgrading, SSPP implementation, emergency response drills, and the role of the DST within the organization.

The Safety Board emphasizes that these selected factors do not represent the full range of conditions that may affect an organization's safety. The Board also notes that, until the NICTD SSPP is fully implemented, significant elements will be absent from the NICTD safety system. Therefore, the Safety Board concluded that, in addition to the specific areas in which the Safety Board recommends that NICTD take action to improve safety, other safety-enhancement opportunities may remain for NICTD to pursue. In particular, the Safety Board is anxious that NICTD take steps to ensure that the implementation of its SSPP results in the production and maintenance of a NICTD safety program that is comprehensive and as effective as possible.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the Northern Indiana Commuter Transportation District:

Work with the U.S. Department of Transportation and the Indiana Department of Transportation to develop and implement a strategic plan to improve safety at Northern Indiana Commuter Transportation District highway-rail grade crossings.  
(R-99-37)

Work with the Indiana Department of Transportation and Indiana's Lake, Porter, LaPorte, and St. Joseph Counties to install stop signs at all your passive grade crossings, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation

of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-38)

Immediately and fully implement your System Safety Program Plan, as required by the Federal Railroad Administration under Emergency Order No. 20, dated February 20, 1996. (R-99-39)

Provide any individual holding the office of director of safety and training with appropriate training, including instruction on the functions, development, and implementation of System Safety Program Plans. (R-99-40)

Elevate the position of director of safety and training to the department-head level and require that the director of safety and training report directly to the general manager. (R-99-41)

Complete the conversion or elimination of signal control line circuits within 2 years. (R-99-42)

Revise your near-miss program to provide closure with individuals reporting violations. (R-99-43)

Develop training procedures and drills, in conjunction with local emergency response agencies, that address conducting emergency responses in all types of geographical conditions. (R-99-44)

Engage an independent safety auditing organization to conduct a comprehensive safety audit of Northern Indiana Commuter Transportation District operations. (R-99-45)

Also, the Safety Board issued safety recommendations to the Indiana Department of Transportation and Indiana's Lake, Porter, LaPorte, and St. Joseph Counties.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-99-37 through -45 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

A handwritten signature in black ink, appearing to read "Jim Hall". The signature is stylized, with the first name "Jim" written in a cursive script and the last name "Hall" in a more upright, blocky cursive style.

By: Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-46 through -48

Mr. Curtis Wiley  
Commissioner  
Indiana Department of Transportation  
Indiana Government Center North  
100 North Senate Avenue, Room N755  
Indianapolis, Indiana 46204-2249

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

In a June 18, 1998, letter to National Transportation Safety Board Chairman Jim Hall, U.S. Senator Richard Lugar and U.S. Congressman Peter J. Visclosky cited three previous accidents that had involved the NICTD system and expressed concern about NICTD's long-term safe operation. The Safety Board reviewed the accident history of the NICTD system and determined that, given the series of incidents experienced on the NICTD line, an evaluation of NICTD's overall safety should be conducted.<sup>2</sup>

The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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<sup>1</sup> National Transportation Safety Board, *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> For additional information, read *Northern Indiana Commuter Transportation District Railroad Safety Assessment*, Railroad Special Investigation Report NTSB/SIR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999)

One of the major issues reviewed during the special investigation concerned safety at NICTD grade crossings. NICTD told the Safety Board that the NICTD system currently contains 151 crossings, of which 103 are public, 37 are private, and 11 are pedestrian railroad crossings at grade. Forty-two crossings have passive railroad warning devices (crossbuck signs), and 11 crossings have no warning devices. Thus, 53 crossings, about one-third of all NICTD grade crossings, currently have passive or no warning devices. Fifteen of the 42 locations with railroad crossbucks are on private crossings, and all 11 crossings with no warning devices are on private crossings.

On July 21, 1998, the Safety Board adopted a safety study of passive grade crossings that detailed the dangers inherent in many passive grade-crossing arrangements.<sup>3</sup> The study noted that

In 1996, passive grade crossings accounted for about three-quarters of all grade crossings in the United States; although there is less highway and train traffic at passive crossings than at active crossings, passive crossings accounted for 54 percent of all grade-crossing accidents and 60 percent of all grade-crossing fatalities in that year.<sup>4</sup>

The report further found that

A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998).

<sup>4</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 61.

<sup>5</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 64.



advance warning devices at some NICTD passive grade crossings poses a risk to NICTD's customers and motorists.

In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

Another area concerning grade-crossing safety examined by the Safety Board was physical improvements to grade crossings. The Safety Board found that NICTD has attempted to make its grade crossings safer through engineering. In 1994, the Indiana Department of Transportation (INDOT) allowed railroads under its authority to apply for corridor improvements. NICTD, through the Northwest Indiana Regional Planning Commission, proposed replacing all its 8-inch crossing signal light units with 12-inch units to make the crossings more visible to motorists. NICTD offered to pay all labor costs if the State would pay for the material. INDOT approved the project in August 1995 but did not provide NICTD with funding or materials to proceed. The Safety Board concluded that making grade-crossing signal lights more conspicuous would provide more effective warning and additional stopping time for motorists approaching grade crossings.

During the 4 years since NICTD proposed making its crossing signal lights more visible, Light Emitting Diode (LED) flashing lights have gained acceptance by the railroad industry because of the dramatically increased conspicuity and reliability they provide. NICTD personnel told investigators that when INDOT takes action on the light upgrading project, NICTD will propose using the newer LED flashing light technology.

In summary with regard to grade-crossing safety on the NICTD system, the Safety Board found through its investigation that several factors point to possible problems in this area. First, NICTD has a relatively high density of grade crossings on its system (approaching two crossings per mile of track), which provides substantial opportunity for grade-crossing accidents to occur. Also, about one-third of NICTD grade crossings have passive or no warning devices, and 11

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<sup>6</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, pp. 68-74.

passive grade crossings on the NICTD system have no signage or advance warning devices. Further, NICTD has experienced a number of grade-crossing accidents and incidents in recent years, and, despite steps taken by NICTD to improve grade-crossing safety, near-miss and other incidents continue to occur at NICTD grade crossings. In addition, NICTD personnel repeatedly expressed concerns about the risks posed by grade crossings. The Safety Board considered that all these factors indicate that a systematic effort on the part of those agencies best equipped to develop methods to improve NICTD grade-crossing safety is needed.

Therefore, the National Transportation Safety Board makes the following safety recommendations to the Indiana Department of Transportation:

Work with the U.S. Department of Transportation and the Northern Indiana Commuter Transportation District to develop and implement a strategic plan to improve safety at Northern Indiana Commuter Transportation District highway-rail grade crossings. (R-99-46)

Assist the Northern Indiana Commuter Transportation District in upgrading all 8-inch crossing signal light units on its territory. (R-99-47)

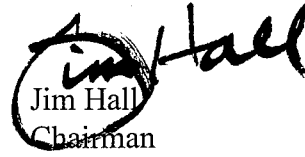
Work with the Northern Indiana Commuter Transportation District and Indiana's Lake, Porter, LaPorte, and St. Joseph Counties to install stop signs at all Northern Indiana Commuter Transportation District passive grade crossings, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-48)

Also, the Safety Board issued safety recommendations to the Northern Indiana Commuter Transportation District and Indiana's Lake, Porter, LaPorte, and St. Joseph Counties.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendations in this letter. Please refer to Safety Recommendations R-99-46 through -48 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:

  
Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-49

Ms. Frances L. Dupey  
President  
Lake County Board of Commissioners  
Administrative Building  
3<sup>rd</sup> Floor LCGC  
2293 N. Main Street  
Crown Point, Indiana 46307

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

In a June 18, 1998, letter to National Transportation Safety Board Chairman Jim Hall, U.S. Senator Richard Lugar and U.S. Congressman Peter J. Visclosky cited three previous accidents that had involved the NICTD system and expressed concern about NICTD's long-term safe operation. The Safety Board reviewed the accident history of the NICTD system and determined that, given the series of incidents experienced on the NICTD line, an evaluation of NICTD's overall safety should be conducted.<sup>2</sup>

The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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One of the major issues reviewed during the special investigation concerned safety at NICTD grade crossings. NICTD told the Safety Board that the NICTD system currently contains 151 crossings, of which 103 are public, 37 are private, and 11 are pedestrian railroad crossings at grade. Forty-two crossings have passive railroad warning devices (crossbuck signs), and 11 crossings have no warning devices. Thus, 53 crossings, about one-third of all NICTD grade crossings, currently have passive or no warning devices. Fifteen of the 42 locations with railroad crossbucks are on private crossings, and all 11 crossings with no warning devices are on private crossings.

On July 21, 1998, the Safety Board adopted a safety study of passive grade crossings that detailed the dangers inherent in many passive grade-crossing arrangements.<sup>3</sup> The study noted that

In 1996, passive grade crossings accounted for about three-quarters of all grade crossings in the United States; although there is less highway and train traffic at passive crossings than at active crossings, passive crossings accounted for 54 percent of all grade-crossing accidents and 60 percent of all grade-crossing fatalities in that year.<sup>4</sup>

The report further found that

A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and

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advance warning devices at some NICTD passive grade crossings poses a risk to NICTD's customers and motorists.

In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Lake County, Indiana, Board of Commissioners:

Work with the Northern Indiana Commuter Transportation District and the Indiana Department of Transportation to install stop signs at all Northern Indiana Commuter Transportation District passive grade crossings in your county, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-49)

Also, the Safety Board issued safety recommendations to the Northern Indiana Commuter Transportation District, the Indiana Department of Transportation, and Indiana's LaPorte, Porter, and St. Joseph Counties.

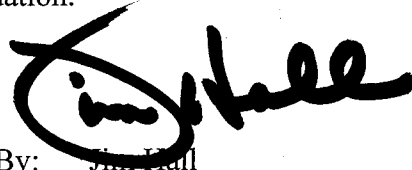
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Safety Recommendation R-99-49 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

A handwritten signature in black ink, appearing to read "Jim Hall". The signature is stylized with a large, circular initial "J" and a long, sweeping horizontal stroke.

By: Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-50

Mr. Brian E. Gesse  
President  
Porter County Board of Commissioners  
155 Indiana Avenue  
Suite 205  
Valparaiso, Indiana 46383

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

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The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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<sup>1</sup> National Transportation Safety Board, *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

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A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and

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<sup>3</sup> National Transportation Safety Board, *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02 (Washington, D.C.: National Transportation Safety Board, 1998).

<sup>4</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 61.

<sup>5</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 64.

advance warning devices at some NICTD passive grade crossings poses a risk to NICTD's customers and motorists.

In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the Porter County, Indiana, Board of Commissioners:

Work with the Northern Indiana Commuter Transportation District and the Indiana Department of Transportation to install stop signs at all Northern Indiana Commuter Transportation District passive grade crossings in your county, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-50)

Also, the Safety Board issued safety recommendations to the Northern Indiana Commuter Transportation District, the Indiana Department of Transportation, and Indiana's Lake, LaPorte, and St. Joseph Counties.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to

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<sup>6</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, pp. 68-74.

Safety Recommendation R-99-50 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

A handwritten signature in black ink, appearing to read "Earl Hall", written over a circular stamp or seal.

By: Earl Hall  
Chairman



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-51

Mr. Clay Turner  
President  
LaPorte County Board of Commissioners  
LaPorte County Courthouse  
809 State Street  
LaPorte, Indiana 46350

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

In a June 18, 1998, letter to National Transportation Safety Board Chairman Jim Hall, U.S. Senator Richard Lugar and U.S. Congressman Peter J. Visclosky cited three previous accidents that had involved the NICTD system and expressed concern about NICTD's long-term safe operation. The Safety Board reviewed the accident history of the NICTD system and determined that, given the series of incidents experienced on the NICTD line, an evaluation of NICTD's overall safety should be conducted.<sup>2</sup>

The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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<sup>1</sup> National Transportation Safety Board, *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> For additional information, read *Northern Indiana Commuter Transportation District Railroad Safety Assessment*, Railroad Special Investigation Report NTSB/SIR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

One of the major issues reviewed during the special investigation concerned safety at NICTD grade crossings. NICTD told the Safety Board that the NICTD system currently contains 151 crossings, of which 103 are public, 37 are private, and 11 are pedestrian railroad crossings at grade. Forty-two crossings have passive railroad warning devices (crossbuck signs), and 11 crossings have no warning devices. Thus, 53 crossings, about one-third of all NICTD grade crossings, currently have passive or no warning devices. Fifteen of the 42 locations with railroad crossbucks are on private crossings, and all 11 crossings with no warning devices are on private crossings.

On July 21, 1998, the Safety Board adopted a safety study of passive grade crossings that detailed the dangers inherent in many passive grade-crossing arrangements.<sup>3</sup> The study noted that

In 1996, passive grade crossings accounted for about three-quarters of all grade crossings in the United States; although there is less highway and train traffic at passive crossings than at active crossings, passive crossings accounted for 54 percent of all grade-crossing accidents and 60 percent of all grade-crossing fatalities in that year.<sup>4</sup>

The report further found that

A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and

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<sup>5</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 64.

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In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the LaPorte County, Indiana, Board of Commissioners:

Work with the Northern Indiana Commuter Transportation District and the Indiana Department of Transportation to install stop signs at all Northern Indiana Commuter Transportation District passive grade crossings in your county, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-51)

Also, the Safety Board issued safety recommendations to the Northern Indiana Commuter Transportation District, the Indiana Department of Transportation, and Indiana's Lake, Porter, and St. Joseph Counties.

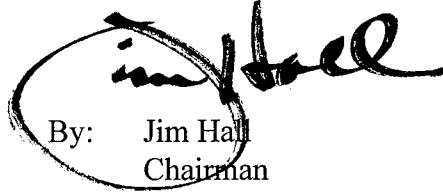
The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to

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<sup>6</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, pp. 68-74.

Safety Recommendation R-99-51 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

A handwritten signature in black ink, appearing to read "Jim Hall", is written over a circular stamp. The signature is fluid and cursive.

By: Jim Hall  
Chairman





# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** R-99-52

Ms. Cynthia A. Bodle  
President  
St. Joseph County Board of Commissioners  
County Commissioners Office  
County/City Building, 7<sup>th</sup> Floor  
227 West Jefferson Blvd.  
South Bend, Indiana 46601

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second trailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the NICTD train while the chain securing a steel coil to the second semitrailer broke. The released steel coil entered the first train car through the front bulkhead and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident.<sup>1</sup>

In a June 18, 1998, letter to National Transportation Safety Board Chairman Jim Hall, U.S. Senator Richard Lugar and U.S. Congressman Peter J. Visclosky cited three previous accidents that had involved the NICTD system and expressed concern about NICTD's long-term safe operation. The Safety Board reviewed the accident history of the NICTD system and determined that, given the series of incidents experienced on the NICTD line, an evaluation of NICTD's overall safety should be conducted.<sup>2</sup>

The intent of this special investigation was not to determine whether NICTD is a "safe" or "unsafe" railroad but to examine those elements of its overall operation known to affect safety and to indicate where improvements could be made in these areas. The Safety Board recognizes that factors not examined in this investigation may also affect NICTD safety, either positively or negatively.

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<sup>1</sup> National Transportation Safety Board, *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

<sup>2</sup> For additional information, read *Northern Indiana Commuter Transportation District Railroad Safety Assessment*, Railroad Special Investigation Report NTSB/SIR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

One of the major issues reviewed during the special investigation concerned safety at NICTD grade crossings. NICTD told the Safety Board that the NICTD system currently contains 151 crossings, of which 103 are public, 37 are private, and 11 are pedestrian railroad crossings at grade. Forty-two crossings have passive railroad warning devices (crossbuck signs), and 11 crossings have no warning devices. Thus, 53 crossings, about one-third of all NICTD grade crossings, currently have passive or no warning devices. Fifteen of the 42 locations with railroad crossbucks are on private crossings, and all 11 crossings with no warning devices are on private crossings.

On July 21, 1998, the Safety Board adopted a safety study of passive grade crossings that detailed the dangers inherent in many passive grade-crossing arrangements.<sup>3</sup> The study noted that

In 1996, passive grade crossings accounted for about three-quarters of all grade crossings in the United States; although there is less highway and train traffic at passive crossings than at active crossings, passive crossings accounted for 54 percent of all grade-crossing accidents and 60 percent of all grade-crossing fatalities in that year.<sup>4</sup>

The report further found that

A systematic and hierarchic approach to improving passive grade crossing safety is needed, an approach that does not depend primarily on the ability of the driver approaching the crossing to see an oncoming train. The hierarchic approach includes grade separation and closure, installation of active warning devices, improved signage, and intelligent transportation systems technology.<sup>5</sup>

The passive grade-crossing safety problems and possible solutions identified in the safety study are applicable to a wide range of rail operations, including NICTD. Eleven passive grade crossings on the NICTD system had no signage or advance warning devices. All were private crossings.

Advance signage and warning devices are not required at passive grade crossings, and the Safety Board understands that NICTD has only limited authority over and responsibility for private crossings. NICTD's main purpose, however, is to provide safe and reliable transportation services to the public. With this charge comes the responsibility to ensure the safety of NICTD's customers and vehicular traffic.

Poor or nonexistent signage provides insufficient information for motorists to make prudent decisions regarding safe courses of action at grade crossings. When motorists make uninformed decisions at grade crossings, the safety of both vehicle and train traffic is jeopardized. Therefore, the Safety Board concluded that the lack of adequate signage and

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<sup>5</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, p. 64.

advance warning devices at some NICTD passive grade crossings poses a risk to NICTD's customers and motorists.

In its 1998 passive grade-crossing study, the Safety Board studied the use of stop signs at passive grade crossings in depth.<sup>6</sup> The Board found that

Despite concerns about the use of stop signs at passive crossings, the Safety Board believes that the benefits of stop signs at passive crossings outweigh the concerns. Foremost, in the Safety Board's opinion, is the need for a system-wide approach that provides consistent information and instruction to the driver. Specifically, (1) the action required by a stop sign is well understood by drivers, (2) a driver stopped at a crossing has more time in which to detect an approaching train, and (3) sight distance along the tracks when viewed from a stop sign is generally accurate, according to study accident data.

The safety benefits provided by use of stop signs at passive crossings are applicable to the passive grade crossings on the NICTD system that lack signage and advance warning devices. When a stop sign is placed at a passive grade crossing, the driver knows where the crossing is and what action must be taken. Such clear communication of critical information would improve safety at passive grade crossings.

Therefore, the National Transportation Safety Board makes the following safety recommendation to the St. Joseph County, Indiana, Board of Commissioners:

Work with the Northern Indiana Commuter Transportation District and the Indiana Department of Transportation to install stop signs at all Northern Indiana Commuter Transportation District passive grade crossings in your county, unless a traffic engineering analysis determines that installation of stop signs would reduce the safety of the crossing. Any Northern Indiana Commuter Transportation District crossings at which conditions are such that the installation of stop signs would reduce the level of safety should be upgraded with active warning devices or eliminated. (R-99-52)

Also, the Safety Board issued safety recommendations to the Northern Indiana Commuter Transportation District, the Indiana Department of Transportation, and Indiana's LaPorte, Porter, and Lake Counties.

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is vitally interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you within 90 days regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to

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<sup>6</sup> *Safety at Passive Grade Crossings, Volume I: Analysis*, Safety Study NTSB/SS-98/02, pp. 68-74.

Safety Recommendation R-99-52 in your reply. If you need additional information, you may call (202) 314-6435.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By:



Jim Hall  
Chairman



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

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**Date:** August 27, 1999

**In reply refer to:** I-99-02 and H-98-33 (Reiteration)

Honorable Rodney E. Slater  
Secretary  
U.S. Department of Transportation  
400 Seventh Street, S.W.  
Washington, D.C. 20590

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About 4:31 a.m. central daylight time on June 18, 1998, a westbound Northern Indiana Commuter Transportation District (NICTD) two-car passenger train struck the second semitrailer of a long combination vehicle that consisted of a tractor pulling two flatbed semitrailers loaded with steel coils at a highway-rail grade crossing near Portage, Indiana. When the vehicles collided, the second semitrailer broke away from the first semitrailer and was dragged by the front of the train, while the single chain securing a steel coil to the second semitrailer broke. The released steel coil, weighing about 19 tons, entered the train through the front bulkhead of the lead car and moved into the passenger compartment. Three fatalities and five minor injuries resulted from the accident. Damages were estimated to total \$886,000.<sup>1</sup>

The National Transportation Safety Board determined that the probable cause of the collision between NICTD train 102 and a long combination vehicle (truck) at the National Steel Corporation's Midwest Steel grade crossing was ineffective action by Federal, State, and private agencies to permanently resolve safety problems at the Midwest Steel grade crossing, which they knew to be a hazardous crossing.

The various entities involved at the Midwest Steel grade crossing were aware that the crossing posed unusual hazards. The relatively high rate of vehicle and train traffic, as well as the number of long combination vehicles using the crossing, were hazard factors noted by NICTD and the other organizations connected with the crossing. Despite their consciousness of the dangers posed by the crossing, they took no effective permanent corrective action to ensure its safety. This lack of action in the face of known safety hazards raises serious concerns about the distribution of responsibilities for ensuring safety at a private grade crossing, such as the Midwest Steel grade crossing.

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<sup>1</sup> For additional information, read *Collision of Northern Indiana Commuter Transportation District Train 102 with a Tractor-Trailer, Portage, Indiana, June 18, 1998*, Railroad/Highway Accident Report NTSB/RAR-99/03 (Washington, D.C.: National Transportation Safety Board, 1999).

The primary difference between public and private grade crossings is roadway ownership, which affects the obligations and indemnification of the parties involved in the crossing activity. At a private crossing, roadway design and maintenance are usually the responsibility of the private entity that owns the roadway. The private entity may enter into a contractual agreement with the railroad(s) regarding the liability for any casualty incurred at the crossing due to any lack of specified maintenance.<sup>2</sup>

The crossing area of the Midwest Steel compound grade crossing consisted of two sets of double tracks, one set owned by the Consolidated Rail Corporation (Conrail)<sup>3</sup> and one by NICTD. The National Steel Corporation had contractual agreements with NICTD and Conrail specifying the National Steel Corporation's responsibility<sup>4</sup> to maintain the crossing signal lights, the gates, and the road surface. This agreement was fiduciary in nature, calling for the National Steel Corporation to furnish the funding for the maintenance of the roadway surface and any crossing signal lights and gates as specified by the respective railroad's division engineer. Should deficiencies in any of these identified areas cause an accident, the National Steel Corporation would be liable. But the contracts do not state that the National Steel Corporation is responsible for the overall safety of the crossing. Contracts governing private crossings often do not specify responsibility for all factors that could affect crossing safety. Because of the distribution of safety responsibilities for private crossings, some important safety factors are not addressed by any agency.

The Federal Railroad Administration (FRA) is responsible for railroad track, train, and signals safety at all grade crossings, whether private or public. The FRA's jurisdiction applies to rail operations only. The FRA oversees the gates, crossing lights, and track gauges for both public and private crossings, ensuring that they meet Federal standards. On the other hand, the Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) have far fewer responsibilities for private crossings than for public crossings. Because it is a private crossing, neither the FHWA nor INDOT has jurisdiction over the highway component of the Midwest Steel crossing.

Consequently, key factors affecting the crossing's safety, such as what types of vehicles may use the crossing, the appropriate configuration of the storage area, and necessary signal timing considerations, are not overseen by any agency. Not only are significant safety elements not addressed by any private or government entity, but the complex interactions between rail and highway operations are not adequately coordinated.

To summarize, no single entity—not the crossing owner, or a railroad, or a Federal or State regulatory agency—was responsible for the safety of the entire Midwest Steel private grade crossing. Therefore, the safety-related developments that affected the Midwest Steel crossing

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<sup>2</sup> Not all private crossings are covered by contractual agreements. In many cases, the owner of the private roadway is unknown.

<sup>3</sup> At the time of the accident, Conrail operated the northern portion of the Midwest Steel crossing. As of June 1, 1999, the Conrail operation in this area was taken over by the Norfolk Southern Corporation.

<sup>4</sup> Depending on the contractual situation, PreCoat Metals, rather than the National Steel Corporation, could be responsible.

over time, such as changes in vehicles using the crossing and in train and vehicle traffic levels, were not reviewed by a single entity, and effective steps were not taken to resolve these recognized safety problems. Several organizations involved in the crossing, including the National Steel Corporation, NICTD, and the FRA, were aware that safety was being compromised at the Midwest Steel crossing, but no entity had or assumed the responsibility to act to solve the problems. Therefore, the Safety Board concluded that the lack of clear delineation of oversight responsibility for the safety of the Midwest Steel private grade crossing undermined its safety.

The private classification of a crossing can affect still other important factors concerning its safety. For instance, funds distributed to the States by the FHWA for making crossing improvements will not, in most States, be available to improve safety at a private crossing. In addition, individual State policy establishes whether existing guidelines and standards for safe crossing design must be applied to both public and private crossings. As noted, the State of Indiana does not have jurisdiction over private crossings; hence, INDOT does not have clear authority to require the same level of design safety at both public and private crossings.

In Indiana and other States, Federal guidelines for the appropriate design and placement of warning devices at grade crossings, as codified in the *Manual on Uniform Traffic Control Devices* (MUTCD), are required to be applied at public crossings.<sup>5</sup> Because of many States' (including Indiana) lack of jurisdiction, however, adherence to the MUTCD guidelines cannot be required at private crossings. Consequently, private crossings in Indiana are not required to meet any standards for signage, pavement markings, or other elements of traffic safety and control.

Following the 1995 Fox River Grove accident,<sup>6</sup> in which a school bus stopped at a grade crossing extended into the path of a train, the Safety Board made the following safety recommendation to the FHWA:

H-96-40

Develop guidelines and amend the MUTCD to provide methods to delineate the area (zone) that a train, or its cargo, or both, may occupy on the track or tracks of a railroad grade crossing so motorists have visual reference points that enable them to ascertain whether their vehicle is encroaching on the travel path of the train, or its cargo, or both.

In a letter dated March 13, 1997, the FHWA stated

The [FHWA] has begun developing delineation and signing guidelines for the recommended zone at railroad grade crossings. The FHWA has worked with the

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<sup>5</sup> The MUTCD provides guidelines for sign, signal, and pavement marking design, as well as for appropriate placement. MUTCD guidelines become State law when each State adopts them; all States are required to adopt the MUTCD or a State manual that conforms to the MUTCD.

<sup>6</sup> National Transportation Safety Board, *Collision of Northeast Illinois Regional Commuter Railroad Corporation (METRA) Train and Transportation Joint Agreement School District 47/155 School Bus at Railroad/Highway Grade Crossing in Fox River Grove, Illinois, on October 25, 1995*, Highway/Railroad Accident Report NTSB/HAR-96/02 (Washington, D.C.: National Transportation Safety Board, 1996).

Illinois Department of Transportation (IDOT) in determining a signing and delineation method which will comply with the requirements of the MUTCD. The IDOT will begin using the method in early 1997. The FHWA has assigned a number and title to a[n] IDOT request for a change to the MUTCD for inclusion of the proposed delineation and signing method; Request VIII-43 C—Roadway Rail Pavement Marking and Signing Plan. The FHWA will consider the IDOT method and other submitted methods and will request public comments through the publication of a Notice of Proposed Amendments to the MUTCD regarding recommended guidance which may be included in the MUTCD as discussed in the above safety recommendation.

In a letter dated May 21, 1997, the Safety Board stated

The Safety Board understands that the FHWA has begun developing delineation and signing guidelines for such zones at railroad grade crossings. The FHWA has worked and will continue to work with the [IDOT] in determining a signing and delineation method that will comply with the design requirements of the MUTCD. Pending amendment of the MUTCD to meet the intent of this recommendation, Safety Recommendation H-96-40 will be classified 'Open—Acceptable Response.'

Recent contact with the FHWA indicates that a Notice of Proposed Rulemaking will be issued in December 1999 to amend the MUTCD to address this recommendation.

Signage of the type specified in Safety Recommendation H-96-40 might have warned the driver of a long combination vehicle of the special hazard the Midwest Steel crossing posed. Therefore, the Safety Board concluded that the use of the MUTCD at private as well as public crossings may help ensure that certain hazardous situations at all grade crossings receive appropriate attention before an accident occurs.

Throughout the United States, roadway ownership establishes whether a grade crossing is classified as public or private. The classification does not take into account the impact each privately owned crossing may have on the safety of the members of the general public who also use it.

The Midwest Steel grade crossing involves more public presence than its designation as a private crossing would imply. About 4,300 public highway vehicles and 132 trains traverse the Midwest Steel grade crossing on an average day. Of the 132 trains, about 14 are Amtrak and 26 are NICTD passenger trains, all carrying members of the public. In addition, during this investigation, the Safety Board found that the Midwest Steel grade-crossing storage area is owned by NICTD (a public agency) and that the collision occurred on publicly owned land.

The Midwest Steel crossing is not the only private grade crossing in the United States with significant public involvement. Many private crossings provide access to public facilities, such as parks or municipal dumps. In addition, many crossings throughout the Nation are traversed by the public riding on passenger trains. The members of the public using these private



crossings are entitled to the same level of safety as is required on public grade crossings. Nevertheless, because of differentiations in how private and public crossings are overseen, funded, and regulated, a lower level of safety may be tolerated on private crossings than on public crossings. The Safety Board concluded that the current method of classifying grade crossings based solely on whether the roadway involved is publicly or privately owned does not provide a uniform level of safety at all grade crossings.

During the Portage investigation, the Safety Board also considered the means used to determine hazard levels at grade crossings. At public grade crossings in Indiana, INDOT uses a formula developed by the U.S. Department of Transportation (DOT) to determine the relative likelihood of accidents occurring at the grade crossing. Those public crossings found to be hazardous under this formula are listed and addressed, in priority order, as crossings requiring safety improvements.

INDOT does not use this hazard index formula to evaluate private crossings, so INDOT never applied the formula to the Midwest Steel grade crossing. However, even if INDOT had evaluated private grade crossings, the hazard index formula used would not have included data on the special characteristics that make the Midwest Steel crossing particularly hazardous.

The DOT-based index employed by INDOT basically considers the volume of vehicular traffic using the crossing, the number of trains traversing the crossing, the types of warning devices at the crossing, and the number of accidents that have taken place at that location. The formula would not take into account the fact that about 30 percent of the trains traversing the Midwest Steel grade crossing are passenger trains. (Systemwide, NICTD reportedly carries 11,000 to 12,000 commuters each weekday.) Nor would the formula consider that, of the 4,300 motor vehicle crossings that take place daily, about 1,800 are made by heavy trucks. Despite the obvious safety problems identified during the Portage investigation, under the limited INDOT hazard criteria, the Midwest Steel crossing would not have been classified as a particularly dangerous crossing, largely because it had experienced only one accident in the past 5 years. The Safety Board therefore concluded that an accurate evaluation of the accident risk at the Midwest Steel grade crossing could not be made using the current hazard index formula because the formula does not reflect the presence of passenger trains and the prevalence of tractor-semitrailers using the crossing.

In its 1998 passive grade crossing safety study, the Safety Board issued the following safety recommendation to the DOT:

H-98-33

Develop a standardized hazard index or a safety prediction formula that will include all variables proven by research or experience to be useful in evaluating highway-rail grade crossings, and require the States to use it.

In the same letter of December 23, 1998, in which the DOT responded to Safety Recommendation H-98-32, the DOT failed to respond to Safety Recommendation H-98-33. Therefore, in a letter dated February 8, 1999, the Safety Board stated

[Safety Recommendation] H-98-33 asked the DOT to develop a standardized hazard index or a safety prediction formula that will include all variables proven by research or experience to be useful in evaluating highway-rail grade crossings, and require the States to use it. Because no response was provided for H-98-33, the Board has classified this recommendation 'Open—Await Response.'

Therefore, based on the foregoing information, the National Transportation Safety Board makes the following safety recommendation to the U.S. Department of Transportation:

Eliminate any differentiations between private and public highway-rail grade crossings with regard to providing funding for, or requiring the implementation of, safety improvements. (I-99-02)

To ensure that the hazard formula used to establish the relative danger posed by a grade crossing is as accurate as possible, the Safety Board reiterates the following safety recommendation to the U.S. Department of Transportation:

H-98-33

Develop a standardized hazard index or a safety prediction formula that will include all variables proven by research or experience to be useful in evaluating highway-rail grade crossings, and require the States to use it.

Also, the Safety Board issued safety recommendations to the Federal Railroad Administration, the Federal Highway Administration, the Indiana Department of Transportation, the National Steel Corporation, the Norfolk Southern Corporation, and the Northern Indiana Commuter Transportation District.

Please refer to Safety Recommendations I-99-02 and H-98-33 in your reply. If you need additional information, you may call (202) 314-6437.

Chairman HALL, Vice Chairman FRANCIS, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in these recommendations.

By:   
Jim Hall  
Chairman



